

An Assessment of Transportation Issues Under Exceptional Conditions: The Case of the Mass Media and the Northridge Earthquake

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ABSTRACT

This study explores how the mass media covered transportation issues following the 1994 Northridge earthquake. The mass media were a vital channel for travel information, and they provided considerable information to the public about the safety of travel, alternative routes, and new travel modes. Using a methodology known as content analysis, it was found that the broadcast media also presented considerable detail and imagery about devastation to the transportation system at large. This study concludes that an alternative to the commercial mass media may be useful, since the implication from this research is that a vital part of disaster recovery rests in the dissemination of balanced transportation news and stories.

INTRODUCTION

The media are often relied on as a source of travel information, and they can become *the* primary source after an incident or natural disaster disrupts normal travel activity. Following the 1994 Northridge earthquake, the mass media became a vital

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channel of transportation news, literally overnight. An opinion poll taken five days after the earthquake showed that the need for travel information was paramount in Los Angeles. Respondents indicated that "finding alternative routes to work and long traffic delays," was the third most serious problem, after "the need to restore electricity," and "cope with stress" (*The Los Angeles Times* 1994).

Under normal conditions, information is recognized as playing a vital role in managing urban transportation activities. In simulations, researchers have examined the impact of information on network performance (Arnott et al 1991; Khattak et al 1994; Jayakrishnan et al 1994). Other researchers have studied the media as a source of information and considered the characteristics of radio traffic bulletins and their likely impact on travel behavior (Dudek et al 1971; Daniels et al 1976; Abdel-Aty et al 1995; Polydoropoulou et al 1995). One research program has looked specifically at the content of messages as a factor (Ball-Rokeach and Schaffer 1995), and others have studied reliance on traffic bulletins during bad weather using survey research (Khattak and De Palma 1997). Radio has been tested as a means to convey timely information about the availability of parking (Khattak and Polak 1993). Teletext, which is used in France, is a source for queries about mass transit routes and connections (Morrison 1996). In addition, broadcast television is growing as a source of ongoing travel news and other information (Hartgen and Casey 1990).

Despite general recognition by transportation planners that media channels play a vital role, there has been little investigation of their role during a crisis or disaster. Exceptions are the recent overhaul of the Emergency Broadcast System in the United States and the Open TALK emergency alert in the United Kingdom, where potential applications include the evacuation of areas, and clearing roads for passage by emergency vehicles (*The New York Times* 1993; *The Daily Telegraph* 1996). While these systems may be in operation moments before or after a crisis, it is conventional broadcasting that is likely to then take over, and reach most people.

For example, during the Northridge earthquake, news about the damage was first communicated by

conventional, over-the-air radio channels. Within a half hour of the main tremor, there were unconfirmed stories over the radio that major sections of the Santa Monica freeway (I-10) had collapsed (Torous 1995). By daybreak, aerial cameras were transmitting pictures of the freeway damage to television viewers. It is believed that helicopter-based television reporters arrived at the scene of the freeway damage before transportation officials. For nearly two weeks after the earthquake, the mass media were the primary source of travel information for the public. However, much of the travel information that they used was provided by the California Department of Transportation, and the timeliness and accuracy of the information probably reinforced in the public mind that transportation officials were in control of the situation (e.g., USDOT et al 1995).

This paper is devoted to: a) developing an understanding of the quantity and type of information about transportation available in the media during this critical post-earthquake period; and b) assessing whether the media spotlighted longer term transportation priorities and needs. This research is focused on the *content* of the mass media, and describes how characteristics of transportation stories changed over time.

The organization of this paper is chronological. The first section describes the period just after the earthquake. For example, what type of travel stories were presented during the crisis, and did they help to restore order? The next section examines information over the next six weeks: as travel conditions normalized, did the media continue to provide travel news and stories? Finally, the paper explores coverage of longer term transportation issues. Conclusions are also presented in the final section.

METHODOLOGY AND SAMPLE

In this research we look specifically at message content, using a methodology known as content analysis. Content analysis is frequently used in the social sciences to describe a message system, or serve as a basis for other inferences (Holsti 1969). In this research, we both describe the environment of media stories and then make inferences about likely decisionmaking and travel behaviors.

The data is based on a universe of stories in three different media. We do not sample stories because news events are not distributed randomly and we make inferences based on cumulative coverage. The broadcast data come from several sources: tapes of evening broadcasts on CBS network television from January 17 to January 25; text transcripts from other network programming; taped video of broadcasting on an NBC affiliate TV station in Los Angeles for January 18 through January 22, 1994; and special Metrolink footage. In the case of radio programming, written transcripts were examined for eight major stations in Los Angeles for January 18 through February 28, 1994.

The analysis of the print media is based on more than 900 news stories in *The Los Angeles Times* between January and September 1994. Stories in San Francisco papers following the Loma Prieta earthquake were also examined. A computerized content analysis was made of *The Los Angeles Times* using 28 categories, with key words such as trains, road repair, Caltrans, and seismic retrofitting. Other analyses, including the study of seismic issues in the press and the broadcast stories, were conducted by trained coders, using instruments that were designed for this study. The coding instruments and full procedures are reported in Torous (1995).

MEDIA COVERAGE IMMEDIATELY AFTER THE EARTHQUAKE

Media researchers frequently study a window 24 to 48 hours after a disaster because of its critical importance (e.g., Wenger 1980; Walters et al 1993). The audience for news is very large, since people are faced with great uncertainty and need to acquire information. For example, on the morning after the Northridge earthquake, nearly 80% said they used broadcast media—television or radio—as their most important source of information (Bourque 1997). Despite power outages, television broadcasts were widely available and there were no signal disruptions in nearby Orange County.

We wished to describe the characteristics of transportation stories during the first 48 hours of coverage, and were guided by issues raised by

Smith (1992). Smith, who is a journalist, studied media coverage following the Loma Prieta earthquake. He observed that the frequency of video footage about transportation damages was shown disproportionately. Using content analysis, he described “excess” attention paid to the collapse of the I-880 freeway and the Bay Bridge. His inference is that these transportation landmarks were visually interesting, so journalists chose to depict them as “symbols” of the overall devastation.

Since many people died in the I-880 freeway collapse, it could be argued that it was the loss of life that led to extended media coverage. A priori, we did not expect transportation stories to receive a high level of media attention, since there was only one direct traffic fatality after the Northridge earthquake.

Working from a tape archive of daytime programming for a local (Los Angeles) television station, two coders independently classified each local news story per its major theme. The intercoder reliability was above 80%. During 6½ hours of programming on January 17, it was found that pictures about the damaged freeways were presented in 31% of the television news stories. Table 1 lists the amount of attention given to different topics: 18% of the televised stories were directly about the downed freeways or road conditions. Another 13% of the coverage occurred when a visual of the freeway collapse was shown, but the narration, or voice over, was not about transporta-

TABLE 1 Coverage of News Stories on Local Television

| Topic | Percentage of stories (9 a.m.–3 p.m.) |
|--|--|
| Recovery of bodies from Northridge Meadow Apartments | 19 |
| Transportation pictures (seared freeways or interchanges) | 18 |
| Transportation “overlay” (picture only, story is not transportation-related) | 13 |
| Gas line breaks and fires | 11 |
| Rescue of janitor from collapsed parking garage | 8 |
| Aftershocks occurring (in real time) | 8 |
| Red Cross and other medical | 8 |
| Other topic or uncoded | 15 |

tion. These “transportation overlays” took place when the newscaster spoke about a different issue (e.g., the closure of schools), but the picture on TV still showed freeway damages. Television producers might have used transportation overlays because more relevant stock footage was not available, or, as Smith has suggested, a transportation visual was more interesting to them and was a dramatic symbol of the crisis at large.

Table 1 shows that considerable broadcast time went to a category called “rescue of janitor” (8%). This concerned the rescue of a janitor trapped under parking garage rubble by digging through concrete debris. Since the stories showed that parking structures were unsafe, this could be construed as additional transportation coverage. The most frequently cited event was the Northridge Meadow tragedy, where the collapse of the apartment building resulted in many fatalities.

Based on the frequency analysis, there is some evidence to support Smith’s assertion that transportation damage can become a visual image for overall damage. On January 17, television viewers saw pictures over and over again that showed massive devastation to the transportation network. This coverage occurred despite the absence of transportation-related fatalities.

We do not know how these visual images influenced individual travel decisions, but communications research has found that initial images are so potent that they will be recalled even when there is conflicting information at a later time (Wenger 1980). One possible outcome is that constant repetition leads people to overestimate the extent of damages. Wenger has dubbed this the “Dresden Syndrome,” since media users come to believe that entire communities have been wiped out, rather than just discrete areas.

In the context of the Northridge earthquake, this may have led commuters to anticipate heavy damage throughout Los Angeles’ 616 miles of freeways. This may have reduced trip-taking, and there is evidence that many travel trips were curtailed over the first few weeks (Yee et al 1995).

However, people may have also curtailed trip-taking because they were busy at home with the cleanup and aftermath of the earthquake. A different outcome from the extensive coverage is that it

focused the attention of both the public and policymakers on the need to provide massive resources for infrastructure repair. Smith (1992) postulated that attention by the news media can accelerate aid from out-of-town policymakers who first learn about the magnitude of damage from television.

We extended our content analysis of television to January 18, the second day after the earthquake. Again, intercoder reliability was found to be above 80%. Analysis indicated a sharp contrast to the coverage of the previous day. By mid-morning, pictures were broadcast of transportation workers clearing rubble from the I-10 freeway collapse so that demolition efforts could begin. In fact, all television aerial coverage of the damaged sites was preempted so that wrecking crews could position their equipment, which was airlifted by helicopters.

Again, we make inferences about the impact this coverage had on individual travel decisions. This prompt and organized effort by transportation officials may have deflected further television coverage of the damages and helped to restore public confidence. It may also have helped to balance the negative imagery shown redundantly during the first day. Both of these are likely outcomes since mass media coverage serves many functions including the regeneration of the community (Walters and Hornig 1993; Walters et al 1989).

MEDIA COVERAGE ONE TO SIX WEEKS LATER

Communications research indicates that after initial media attention to a disaster, there is a precipitous drop in the number and frequency of stories (Singer and Endreny 1993). We found a similar pattern for nationally televised news, as the number of stories about the earthquake declined by nearly one-half after January 20, the third day of coverage (Torous 1995). This might be attributed to several factors, including the development of more “newsworthy” stories elsewhere, the cost of keeping a camera crew on the site, the cessation of emergency conditions, and a general decline in reader/viewer attention.

While national media coverage may drop off quickly, the resolution of transportation issues is likely to take some time. For drivers, the need to find new routes, explore new travel options, or

adjust the time of travel can continue over weeks and months. A content analysis coded for the presence of specific route or mode information, such as maps, detours, or timetables. The analysis verified that in the local mass media—radio, television, and newspapers—there was extensive travel information and it continued over many weeks. Table 2 shows the type of travel information that was broadcast on television news during the first week. Almost 60% of the news stories about transportation had specific information to help travelers.

Among the mass media, *The Los Angeles Times* had the longest and most complete coverage of route information, as they were not constrained by the space and time of broadcast channels. Radio coverage provided numerous traffic reports, as well as news stories about the status of road reconstruction and new bus and train operations. Most of the travel reports on radio, and in the other media, were based on information that was initially sourced by the California Department of Transportation (Caltrans). They held daily press briefings commencing on the third day after the earthquake.

One of the most unique aspects of news coverage in the weeks after the earthquake was the attention paid by all three media to stories about train service. The frequency of stories mentioning buses, trains, carpools and high-occupancy vehicle lanes was compared across radio, television, and newspapers. All of these topics sharply declined in frequency after the earthquake, with the exception of stories about Metrolink service. The attention to Metrolink is particularly interesting, since the scale of operations for the freeway system and Metrolink is so immensely different. However, media attention could convey the sense that Metrolink was a solution.

According to interviews conducted with Metrolink officials, two issues helped to keep the train service in the media spotlight: one was the frequent opening of new train stations and expanded service, and the second was the perceived newsworthiness of commuter train service to Los Angeles. Metrolink had been in operation for about 15 months before the earthquake, but had not been widely publicized. Since the earthquake provided an opportunity for many people to learn about its service, we were

TABLE 2 Travel Information on Television News: January 17–22

| Message advisory | Percent |
|---|---------|
| Verbal advice on closed roads and detours | 60 |
| Stay at home—do not travel | 15 |
| Vehicular travel is slow/dangerous | 11 |
| Travel time is slow/congestion | 4 |
| Other | 11 |

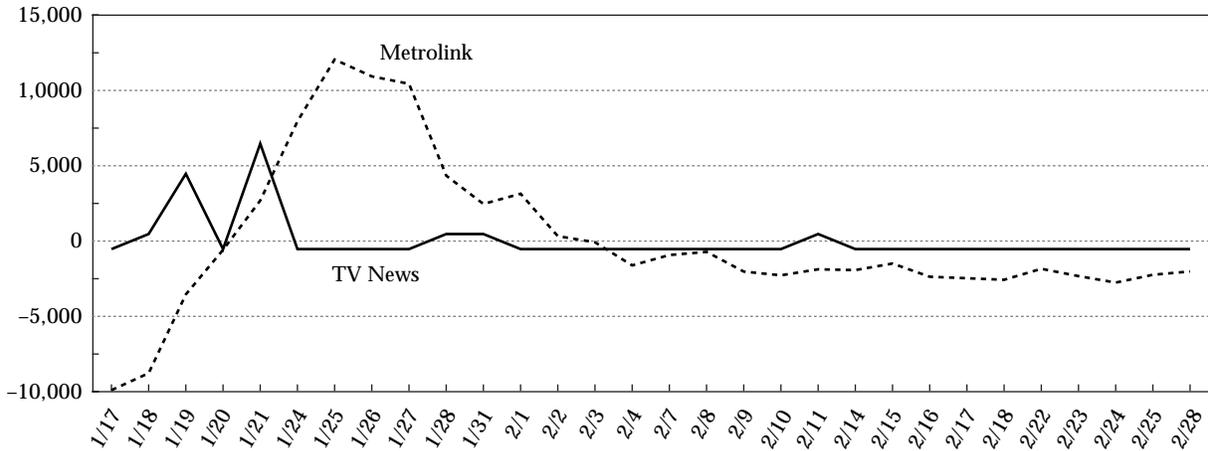
interested to test whether earthquake-related publicity was associated with new ridership.

To examine this we conducted a lagged time series analysis between media coverage and train ridership on the Santa Clarita line of Metrolink. Data from radio was not available for this analysis, and our results underestimate the media effects since drivers delayed by congestion would be receptive to radio broadcasts about an alternative mode. For this investigation, we used the stories about Metrolink carried on one local television station and by *The Los Angeles Times*, for a six week period (January 17 through February 28, 1994). We verified that content presented on other local television stations was similar.

Figure 1 shows the association between the frequency of television news coverage and daily Metrolink ridership. It can be seen that an increase in television coverage precedes the gain in Metrolink ridership immediately following the earthquake, and again at the end of January. After this, there was very limited coverage of Metrolink on television, but even brief coverage in early February appears to be associated with an increase in Metrolink ridership. The time lag between television coverage and ridership varies between two and five days. That is, after broadcast on television, ridership increased over the subsequent period. The direction of the lag clearly favors television news coverage predicting ridership. In table 3, it can be seen that five of the lagged relationships are statistically significant at the 5% level.

Newspapers lack television's ability to convey pictorial content that is simple, direct, and instructive. On the other hand, newspapers can present longer stories and more analysis and interpretation. To test their role, we examined the relationship between the frequency of newspaper coverage

FIGURE 1 Time Series of Metrolink Ridership (Santa Clarita Line) and Occurrence of Television News Stories



Note: The data in each series have been standardized to have a zero mean, and the media data are scaled by 1,000. Since train service was not offered on weekends, weekend media coverage was treated as a Friday occurrence.

TABLE 3 Lagged Correlation Coefficients of Television and Newspaper Stories

| Lag | -7 | -6 | -5 | -4 | -3 | -2 | -1 | 0 | +1 | +2 | +3 | +4 | +5 | +6 | +7 |
|------------|-------|------|------|-------|-------|-------|-------|-------|------|------|------|------|------|-------|-------|
| Television | -0.14 | 0.01 | 0.18 | -0.29 | -0.22 | -0.26 | -0.21 | -0.01 | 0.23 | 0.46 | 0.55 | 0.65 | 0.42 | 0.39 | 0.33 |
| Newspaper | 0.08 | 0.16 | 0.31 | 0.38 | 0.38 | 0.35 | 0.43 | 0.56 | 0.52 | 0.52 | 0.35 | 0.17 | 0.00 | -0.22 | -0.30 |

Key: boldface ≤ 0.05

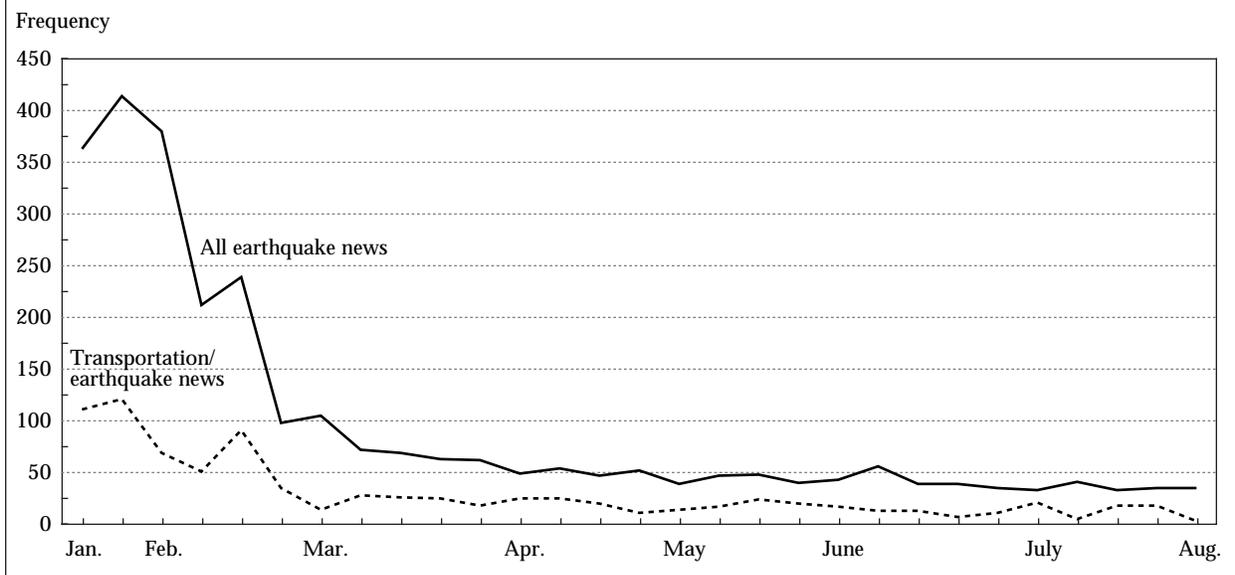
and Metrolink ridership. Table 3 shows the magnitude of the lagged correlation coefficients. For newspapers, there is some increase in ridership on the first and second day *after* stories appear, but there is also a “reverse” association—an increase in Metrolink ridership is associated with a subsequent increase in news stories. Editors probably judged new train ridership to be a newsworthy issue, and there were headlines and pictures of busy trains.

From ridership data, we know that the initially high levels of Metrolink use fell once commuting conditions normalized. It appears that the mass media, and television in particular, may have had an initial role in acquainting people with the service and encouraging trial use. Commuters probably first learned about this alternative mode of travel from television, and televised pictures also conveyed helpful information about the location of new stations, boarding procedures, and so forth.

LONGER TERM MEDIA COVERAGE

According to an interview with a local radio traffic service, it took between four and six weeks after the earthquake for road travel to stabilize (Metro Traffic News Service 1994). After the initial surge of media coverage, and special attention to Metrolink, was there sustained attention to transportation issues? We were able to investigate this through content analysis, as *The Los Angeles Times* maintains an archived database of all stories. Unfortunately, we were not able to obtain detailed longitudinal data for other media. Using a computerized content analysis of the full text, individual stories were classified by occurrences of key words (Torous 1995). Figure 2 shows that transportation issues closely parallel other reporting about the earthquake. Initially, transportation issues were mentioned in about 25% of the earthquake stories, but over time the proportion of transportation stories gained. The recovery of the transportation network stayed on the media agenda while other concerns, like emergency shelter,

FIGURE 2 Frequency of All Stories in *The Los Angeles Times* About the Earthquake and Those Specifically About Transportation and Road Repair



medical care, and food, were resolved within weeks. The reopening of freeway exchanges in May and July 1994 is associated with temporary increases in news coverage.

Through the computerized content analysis, individual stories were examined in terms of positive or negative effect. Among stories on rebuilding and reopening roadways, there was supportive coverage. Negative factors were seldom mentioned, such as noise pollution, dissent about rebuilding, or the cost. In newspaper editorials, Caltrans was praised for awarding contracts with financial incentives for early completion.

There was one topic where analysis showed that press coverage was more equivocal for transportation policy. Seismic repair and seismic safety were continuing topics of discussion beginning with a front-page analysis on January 18. Between January and July 1, 1994, there were a total of 66 stories in the local newspaper. A separate analysis found that the issue coverage could be distinguished across two time periods. During the first six weeks after the earthquake, the press was seen to be neutral about the cause of the seismic collapse. Following this, stories and editorials were prone to cite delays from party politics and an unresponsive state government. A content analysis coded the “sources” said to be responsible for the seismic failures (see table 4). In June 1994, voters in California defeated a bond measure to allocate

new funds for seismic repair. Since the measure was statewide, its defeat cannot be linked to opinions expressed by a single source (e.g., *The Los Angeles Times*). Nonetheless, it would be useful to study how this issue was treated by other media, and the broadcast channels in particular.

RECOMMENDATIONS AND CONCLUSIONS

This study has explored media coverage about transportation across three different time periods following the Northridge earthquake. The content, or messages, within the media have been the particular focus. Where appropriate, we have tried to make inferences about likely impacts on travel behaviors and activity.

The combined analyses point to the media as a potent influence. The presentation of transportation-related stories is of considerable importance to the public, emergency workers, and transportation planners alike. Stories in the media can take two general formats. One format is fairly straightforward, for example, official travel advisories and route information. Following a disaster, transportation officials provide and package travel advisories for the news media. Daily press conferences between transportation authorities and the media are used to disseminate much of this information.

The second format of travel information is not as widely understood. Smith (1992) suggests that it

TABLE 4 Agencies and Issues Cited by Newspaper Reporting

| | Percentage of occurrences | |
|--|---------------------------|-----------------------|
| | 1/17-2/28/94 (n=33) | 3/1-6/30/94 (n=33) |
| Agency to blame or at fault | | |
| Caltrans | 36 | 36 |
| Employee union | 9 | 3 |
| State Legislature | 12 | 12 |
| Governor | 6 | 33 |
| Other | 6 | 3 |
| Policy that is blamed or at fault | | |
| State budget constraints | 3 | 9 |
| Competition with other state programs | 6 | 3 |
| Competition with other transportation programs | 6 | 12 |
| Caltrans priorities (new v. old) | 17 | 9 |
| Competition with Bay area retrofits | 3 | 9 |
| Caltrans delays in completing retrofits | 15 | — |
| Poor administration or supervision of retrofit | 6 | 12 |
| Inadequate assessment of structures | 3 | 12 |
| Seismic standards not strict enough | — | 3 |
| Bureaucratic constraints on contracting | 15 | 12 |
| Public safety compromised by politics | 18 | 36 |

Note: Multiple codes were allowed per story.

is construed from the storytelling needs of journalists. Ongoing news coverage can contain numerous pictures and references to the transportation system. For example, no one anticipated that pictures of downed freeways and seared interchanges would represent more than 30% of the visual coverage on television on January 17. These are images and content that transportation officials do not control.

We found that on the first day of the earthquake news about transportation damage “overwhelmed”

the media agenda. Initial pictures showed uncountable devastation, but on the second day other aspects like quick reaction and demolition and removal by transportation authorities emphasized a positive response. The arrival of demolition equipment by helicopters was a newsworthy event, and may have helped to counter the initial imagery of overwhelming destruction.

For nearly six weeks after the disaster, the media presented a steady amount of news about travel, including route information, road conditions, and travel timetables. We found a particular emphasis on news of Metrolink train service, and there was some indication that televised stories were associated with a temporary increase in ridership, while recognizing that other factors also led people to use the train (see Giuliano 1996).

A careful mix of informational text and visual route maps might help the public, and lead them to make different decisions about mode choice, departure time, route choice, and diversions. An alternative to the commercial mass media may be useful, since the implication from this research is that a vital part of disaster recovery rests in the dissemination of balanced transportation news and stories.

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